Risk Management Hands-On Workshop

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4 October 2004

WORKSHOP PRE-WORK

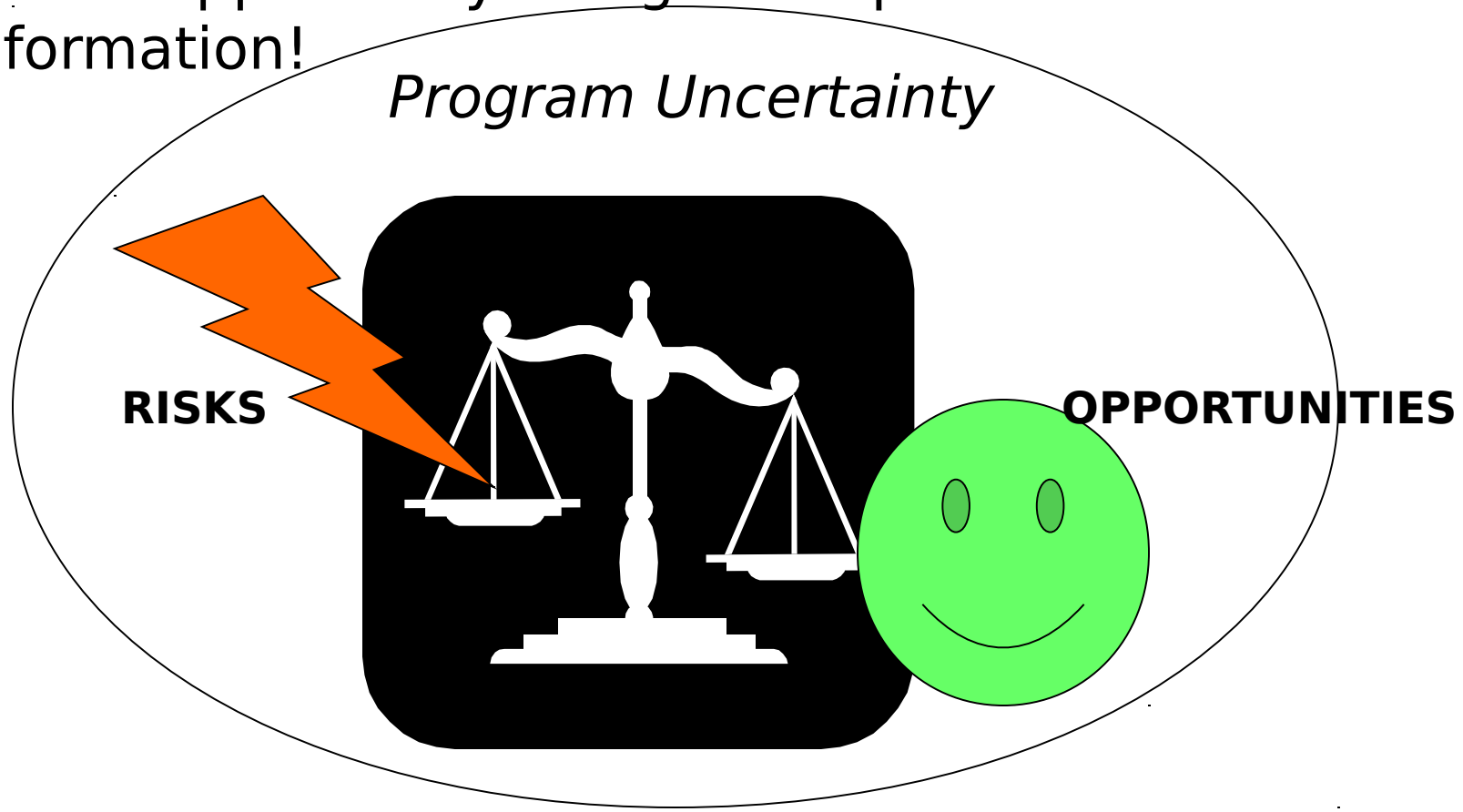
- ***PRIOR*** TO THE WORKSHOP…
  - ASSEMBLE TEAM
  - LOOK AT SIMILAR PROJECTS
  - LOOK AT LESSONS LEARNED DATABASES
  - MANAGEMENT INFORMATION SYSTEMS
  - COLLECT AND REVIEW SPECIFIC PROJECT INFORMATION FROM DOCUMENTATION
  - IDENTIFY EXPERTS THAT MAY HELP THE PROGRAM AND WRITE QUESTIONS

Objectives

- Define program risk
- Describe the characteristics of risk
- Describe the benefits of using risk management techniques
- Describe the role of program managers
- Draw risk management process
- Use group techniques to identify project risks
- Classify risks under people, process, or technology categories
- Evaluate / prioritize risks
- Develop risk handling strategies
- Describe risk monitoring methods used to document and update risk and program plans

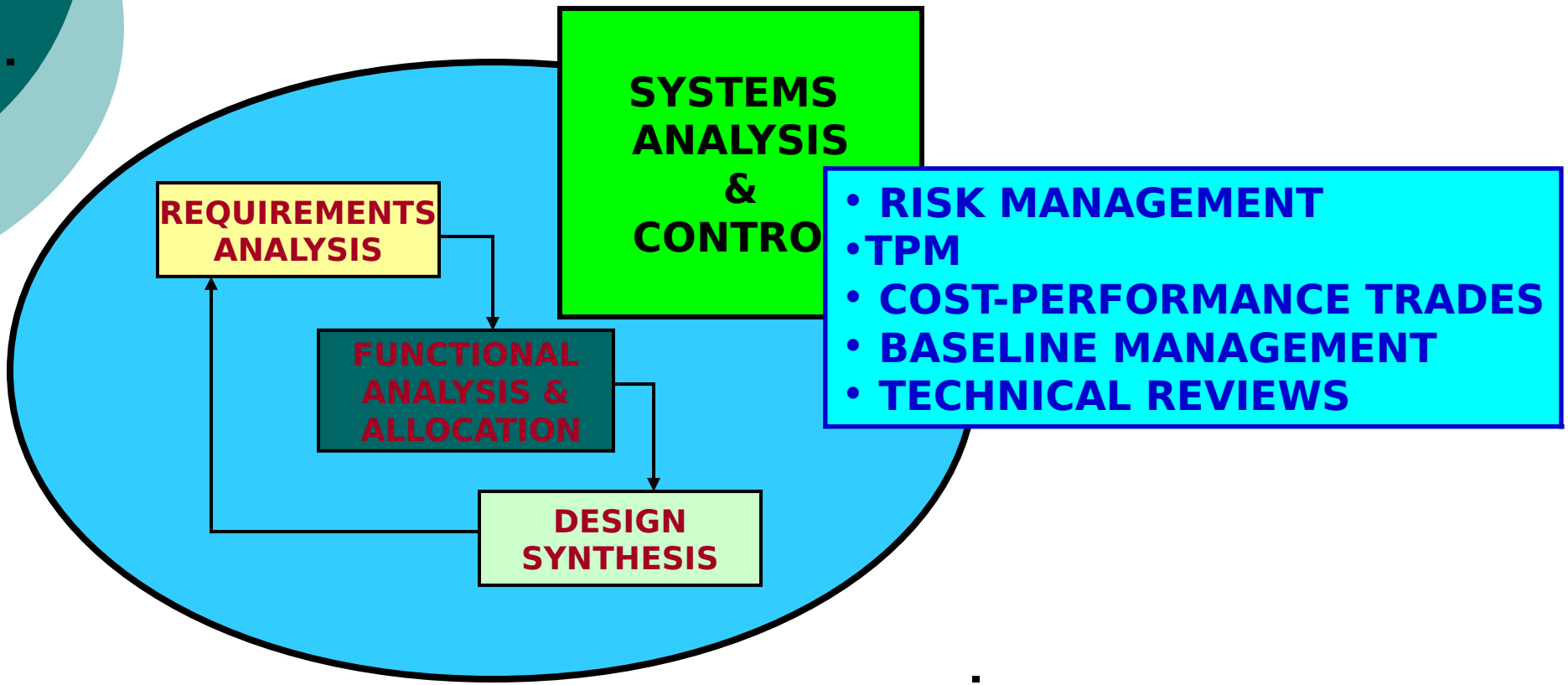
Program Management

- Program decisions are made weighing risk versus opportunity using incomplete information!



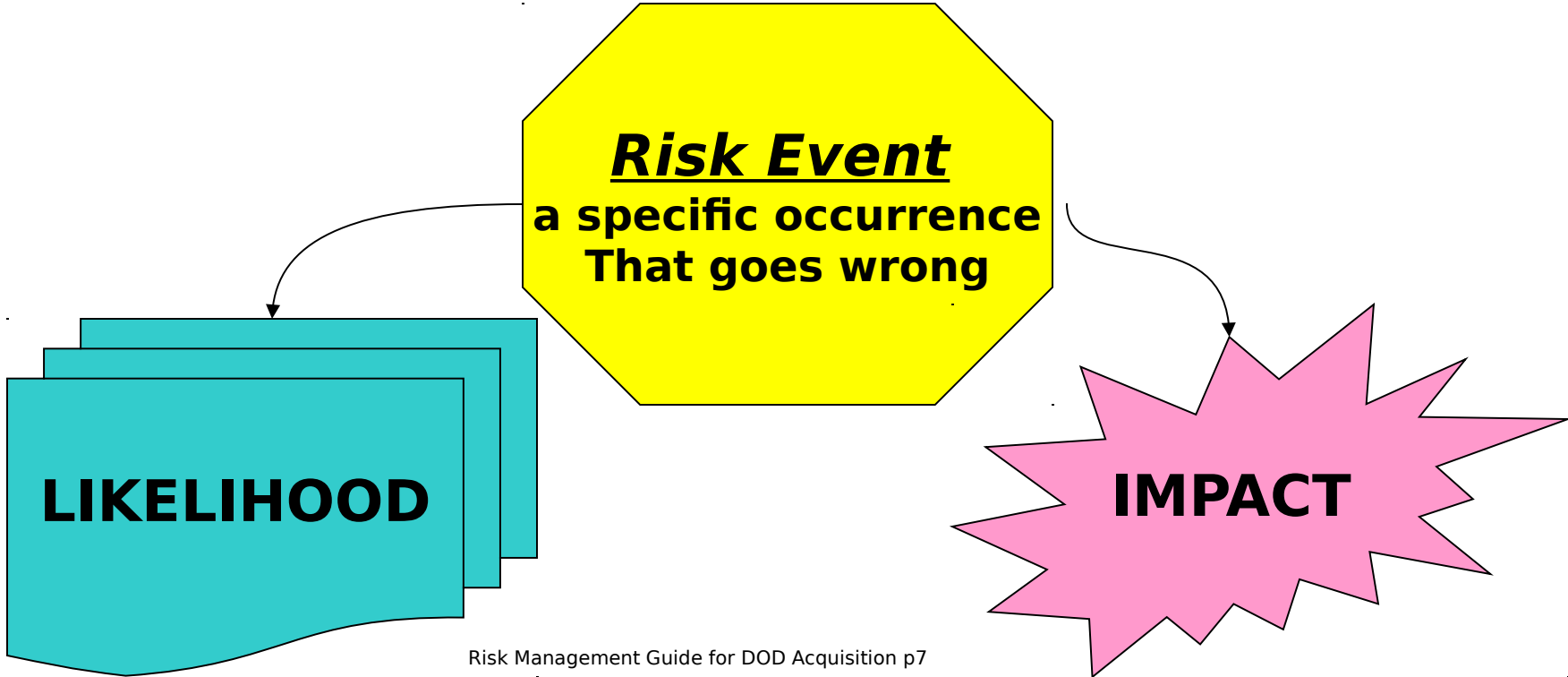
The Systems Engineering Process

Systems Analysis and Control Tools



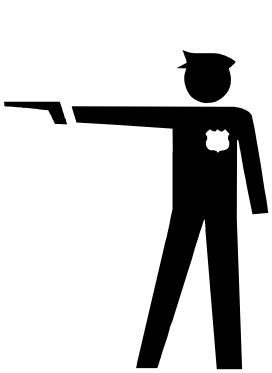
Risk Management Definitions

- ***Risk*** **–**A measure of *potential* inability to achieve program objectives and their probable consequences within constraints.



Risk Characteristics

- Identifying then measuring risk depends on a lot of things!



Risk Event Relationship (Risk chain)

Situation

Size

Risk Management

- **Definition:** The act or practice of dealing with risk. **Process** used to plan for risk, assess (identify and analyze) risk areas, develop risk handling options, monitoring risks to determine how they have changed and documenting the overall risk program.

Effective Risk Management

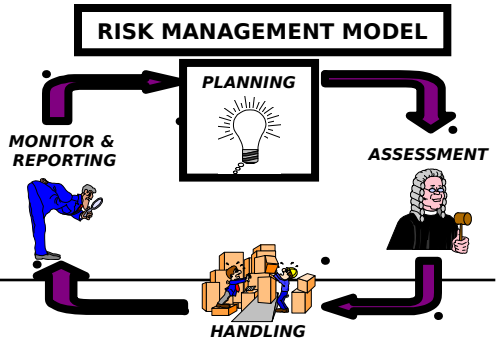
Develops And updates Risk Plan

PM Leads effort
*Systematic
*Continuous
*Iterative
*Uses the team

Team Changes
-Adjusts Leadership
-Finds right people

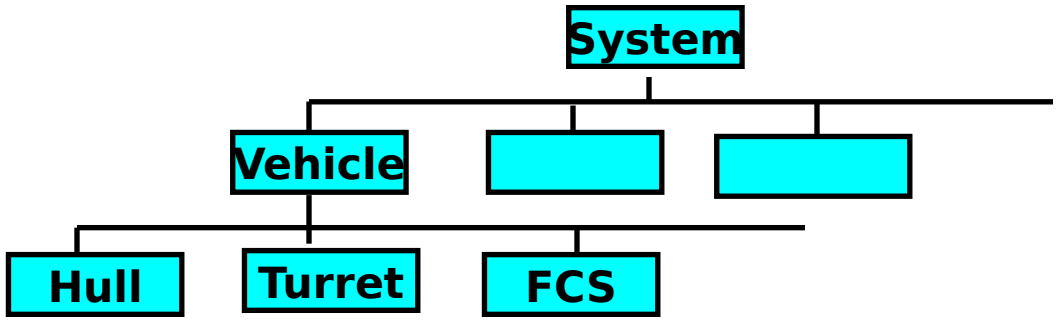
Program Changes
*Cost
*Schedule
*Performance

WHAT Do You Evaluate?



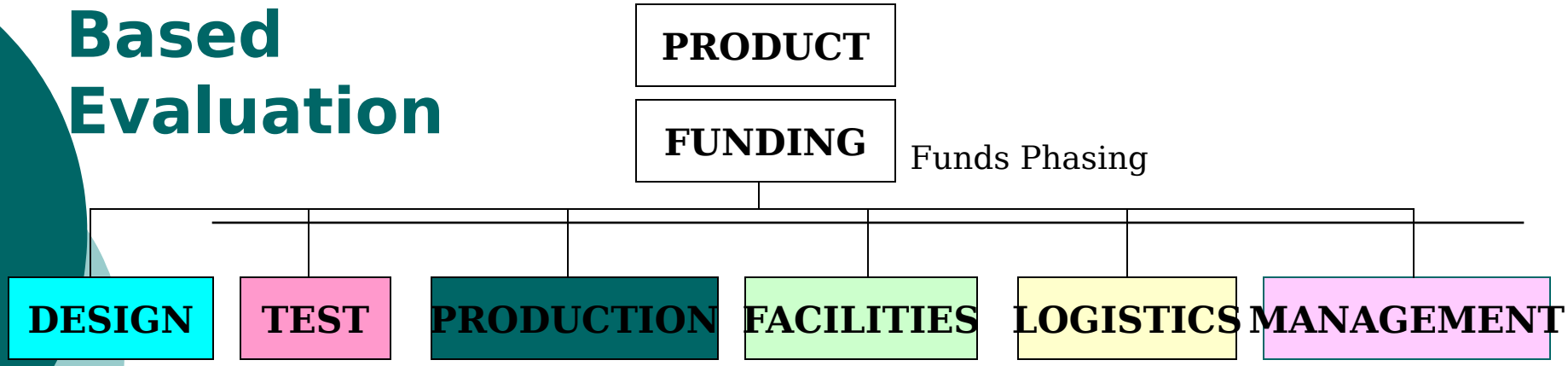
- Risk Events are typically identified using one of three approaches:
  - **Product** based evaluations using WBS
  - **Process** based evaluations using DoD 4245.7-M
  - **Scenario** based evaluations

Product Based Evaluation



- The WBS is an excellent basis for IPT assignments
- If multiple problems involve specific functional areas, a process evaluation may be in order

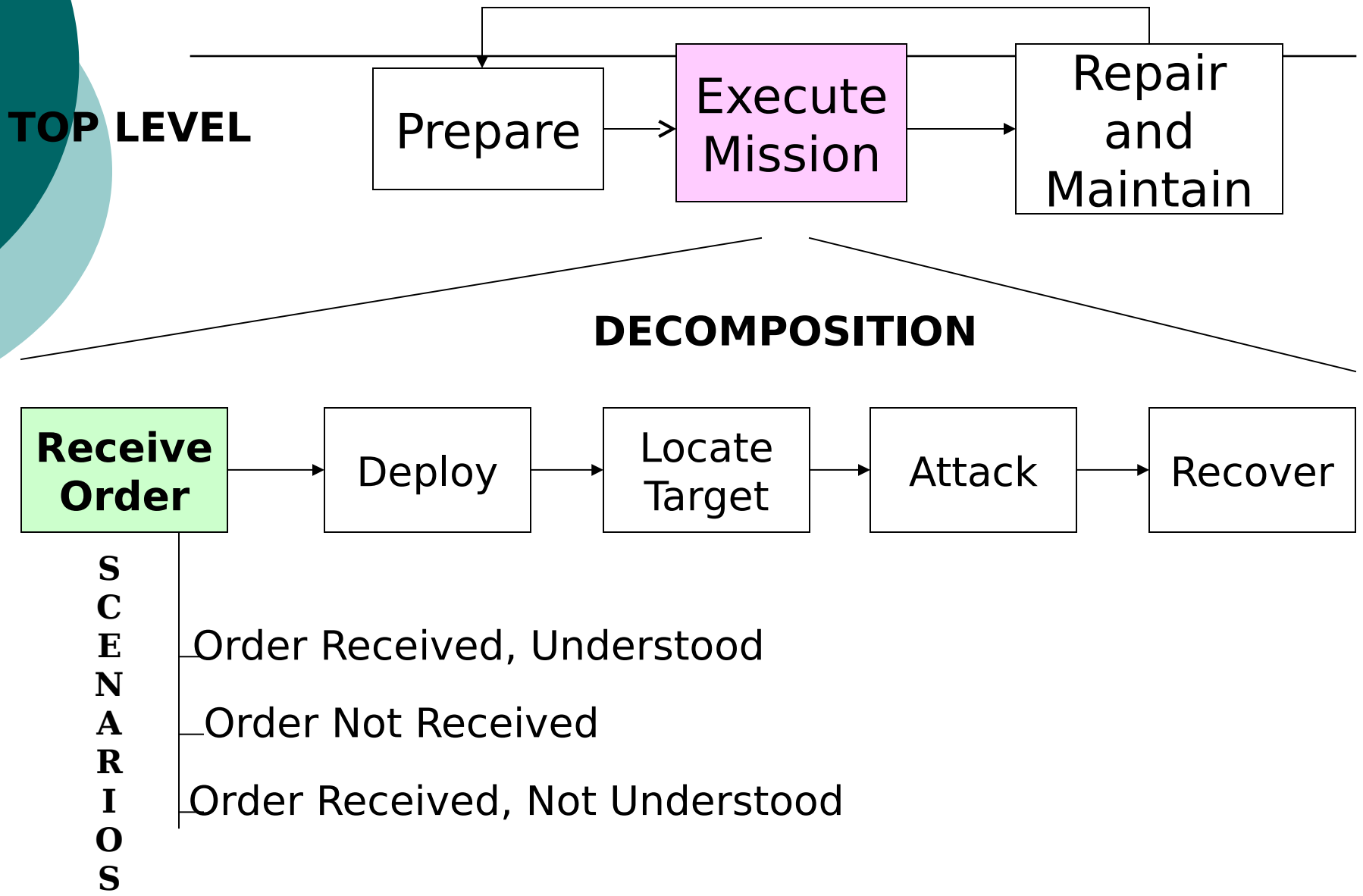
Process Based Evaluation



DESIGN	TEST	PRODUCTION	FACILITIES	LOGISTICS	MANAGEMENT
Mission Profiles	Integrated Test	Mfg Plan	Modernization Factory Improvements	Log Spt Analysis	Manufacturing Strategy
Design Rqmts	Failure Rpt	Quality Process	Productivity Center	Manpower Spt & Test Equipment	Personnel Requirements
Trade Studies	Test Reports	Price-Part Cntl		Training	Data Management
Design Policy	Software Test	Sub Kr Cntl		Equip Spares	Tech Risk Assessment
Design Processes	Design Limits	Defect Control			Production Breaks
Design Analysis	Life	Tool Planning			
Parts/Matl Selctn	TAAF	Spcl Test Equip			
Software Design	Feedback	CAM			
CAD		Mfg Screening			
Design for Test					

DoD 4245.7-M, Transition to Production

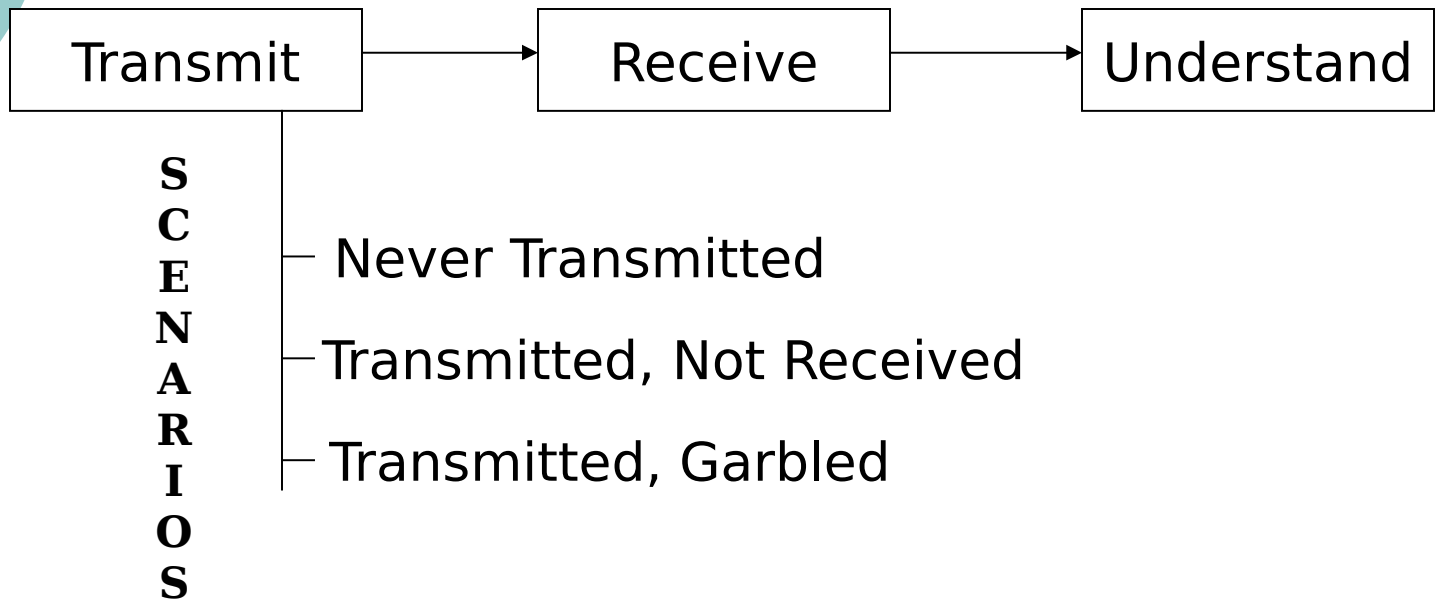
Scenario Based Risk Identification



Scenario Based Risk Identification

Receive Order

FURTHER DECOMPOSITION AS REQUIRED



WHEN DO YOU ASSESS WHAT?

Risk Assessment Technique	Applicable Acquisition Phase	Risk Areas and Processes
Plan Evaluation/Risk Identification	All phases	Program Plans and critical communications with the developer
Product WBS Risk Assessment	All phases starting with completion of the Contract WBS	All Critical Risk Areas except threat, requirements, cost, schedule
Process Risk Assessment (DoD 4265.7-M)	All phases but mainly System Devel & Demo	All critical risk processes
Cost Risk Assessment	All Phases	Cost critical risk areas
Schedule Risk Assessment	All Phases	Schedule critical risk areas

Successful Product Developments Are Anchored In Knowledge (GAO)

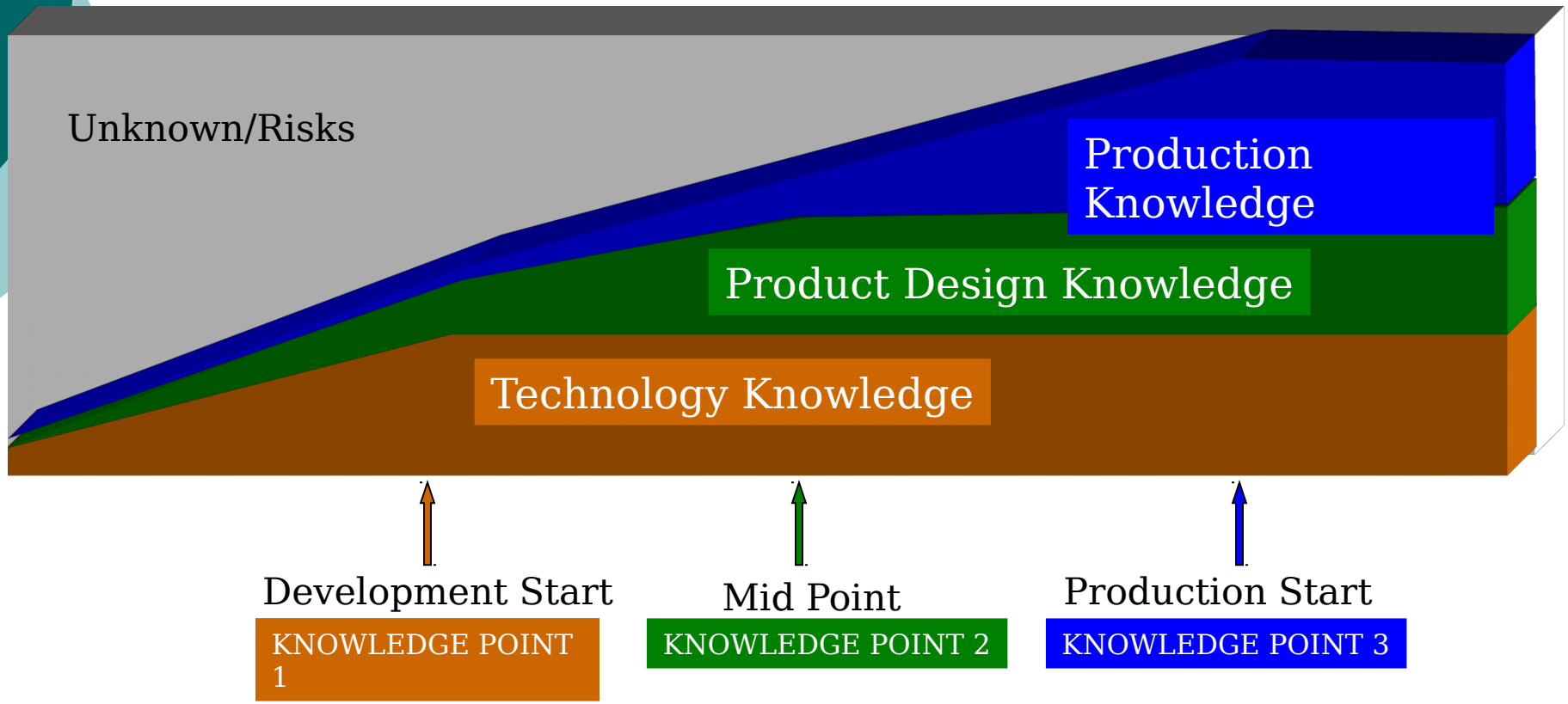
A knowledge-based approach makes it possible to develop more sophisticated products faster and less expensively than their predecessors.

Knowledge Point 1: At **milestone B**, a match is achieved between the user's needs and the developer's resources (indicator: technology readiness level).

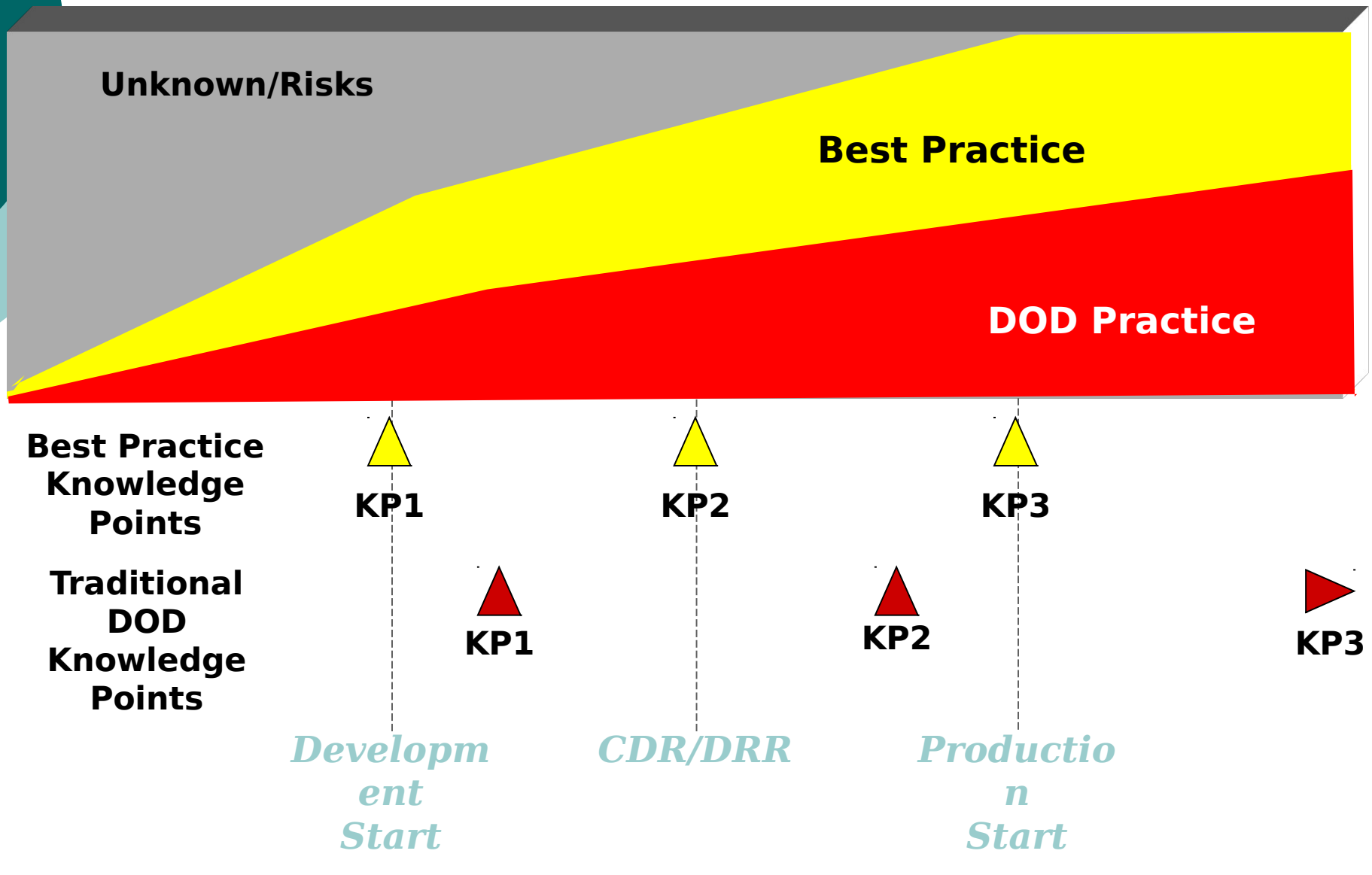
Knowledge Point 2: At the **design review**, the product design demonstrates its ability to meet user needs and is stable (indicator: % of engineering drawings released).

Knowledge Point 3: At **milestone C**, it is demonstrated that the product can be produced within cost, schedule, and quality targets (indicator: % of key processes in statistical control).

Best Product Development Practices



Best v. DOD Practices for Building Product Knowledge



Program Outcomes

Continued Changes Until Maturity Reached

Labor inefficiencies

Quality problems

Problematic Case

Production begins

Processes not in control

Design changes

Mature Product

Unstable design

Production begins

Processes in control

Immature technology

Proven reliability

Stable design

Successful Case

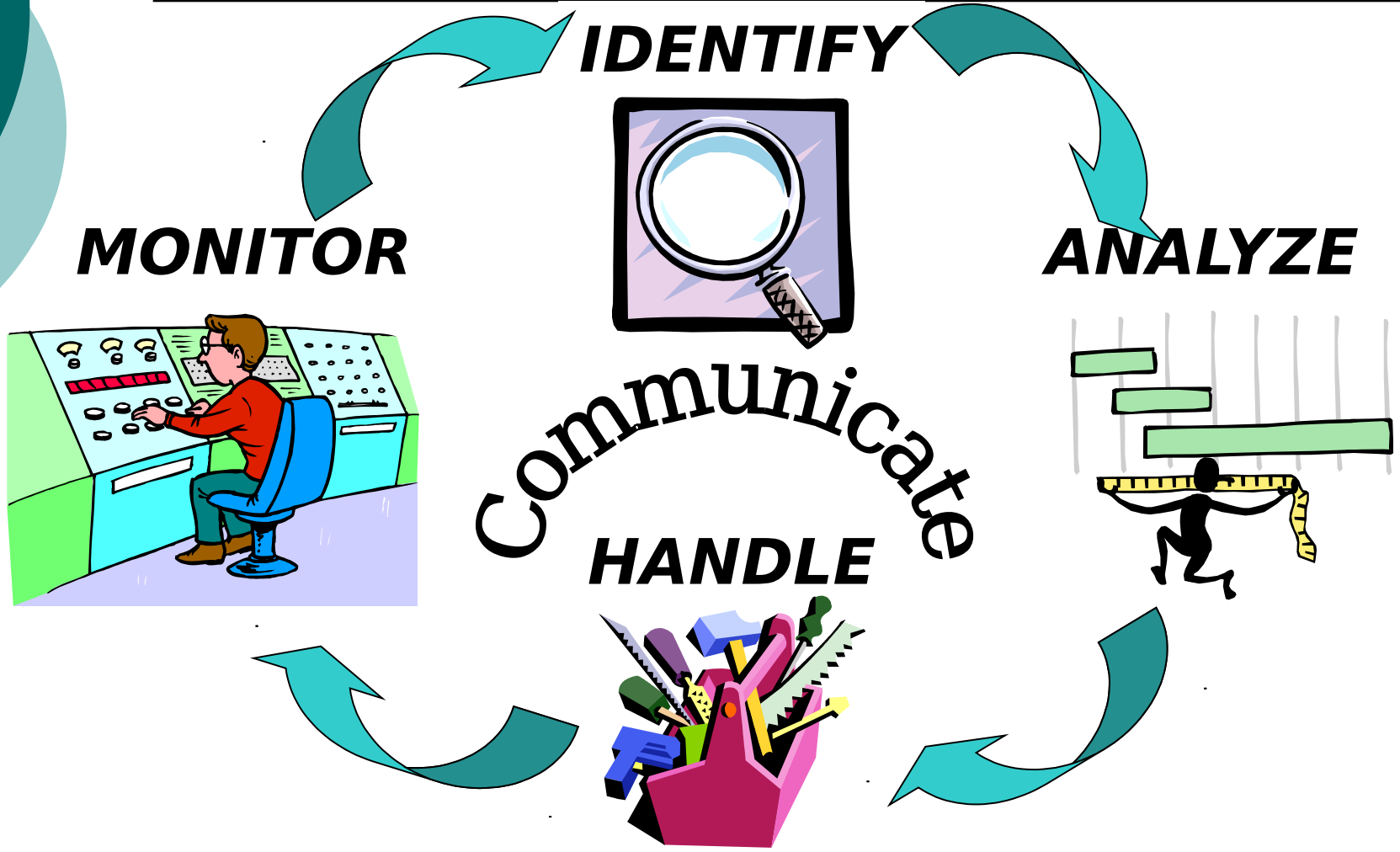
Mature technology

Begin a program

Program cost

Program

RISK MANAGEMENT MODEL



IDENTIFY

How to write a risk statement

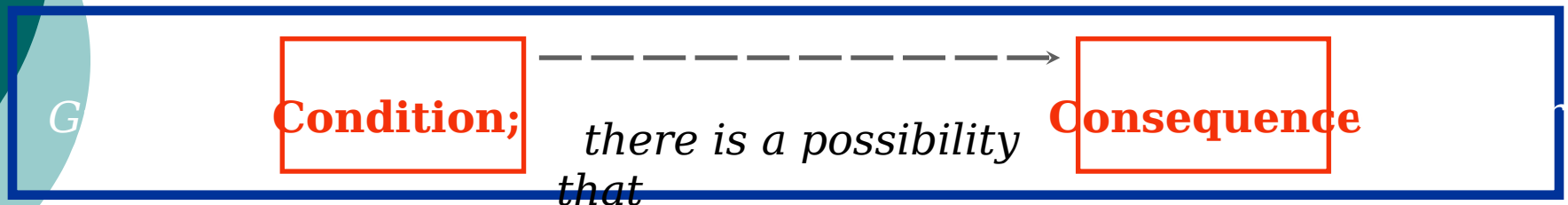
1. **An** IF - THEN **type of risk statement.**

2. **A** CONDITION - CONSEQUENCE **risk statement**. **Given the "condition", there is a likelihood that "consequence" will occur.**

Sample of Statement 1

- **EXAMPLE:** “If our one and only software engineer cannot work on the project for some reason, may cause a schedule delay.”

Sample of Statement 2



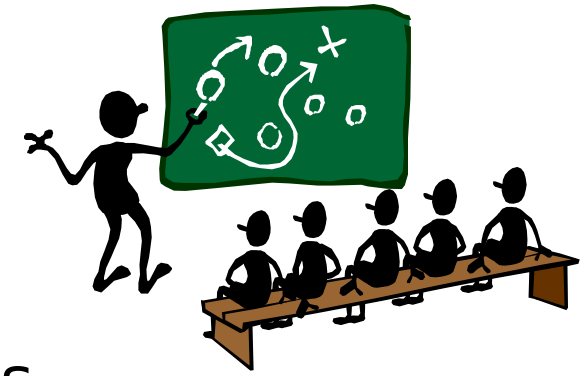
- Condition: **a single phrase that identifies possible future problems, and describes current key circumstances, situations, etc., that are causing concern, doubt, anxiety, or uneasiness**

- Consequence: **a single phrase or sentence that describes the key negative outcome(s) of the current circumstances**

- **EXAMPLE** : “Insufficient warning system volume output may cause delay in platform fielding.”

Risk Events: Identification

- **People**
  - Users
  - Relationships
  - Decision Makers/Authorities
  - Organizations
  - Availability
  - Talent/Skill Level/education
  - Experience
  - Motivation/Morale
  - Safety



Risk Events Identification

- **Process**

Requirements

Time/Schedule

DESIGN

Logistics

Management

Project size/scope

Management

Threat

Cost-Estimation/Control

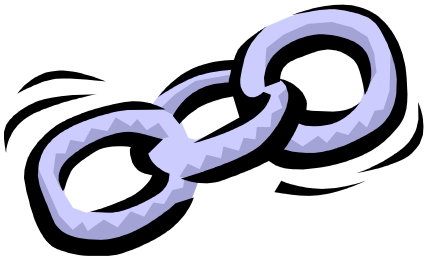
Budget

Test and Evaluation

Legal/Regulatory

Procurement

PRODUCTION



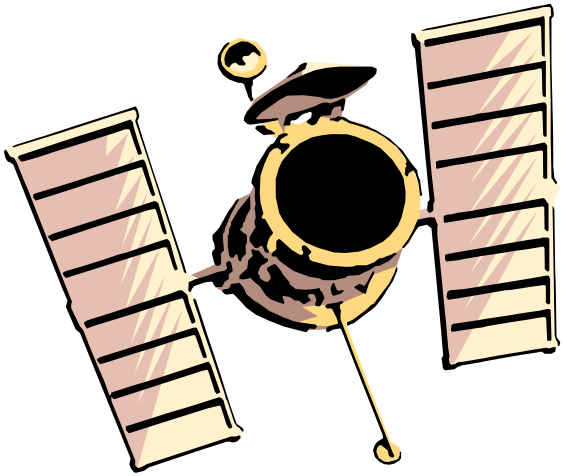
Test

Facilities

Systems Engineering

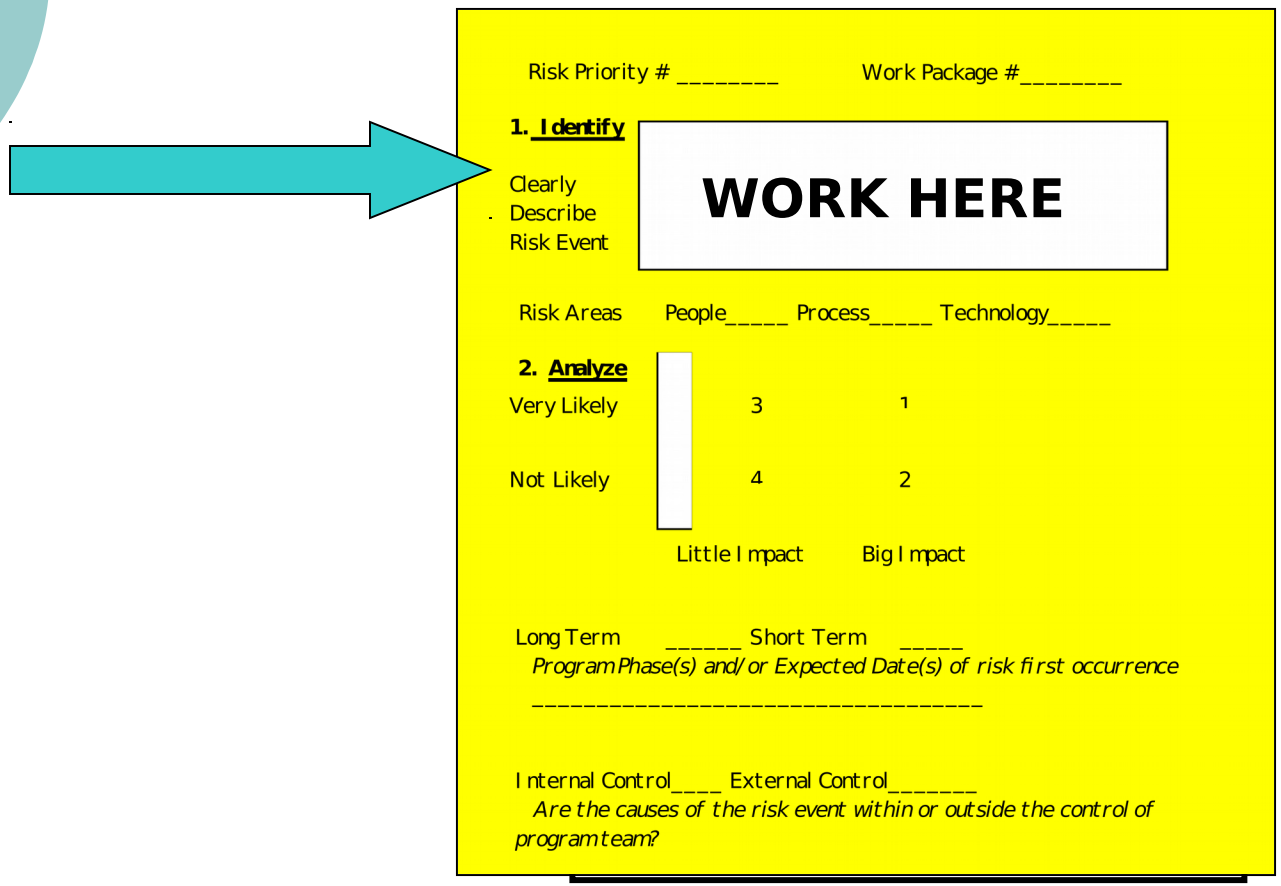
Risk Events Identification

- **Technology (Level of Maturity)**
  - Change
  - New or Obsolete
  - Adoption/Use
  - Integration/Interfaces
  - Team (Government/Contractor) technology expertise
  - Security
  - Architecture
  - Scalability



RISK IDENTIFICATION: Output-risk events

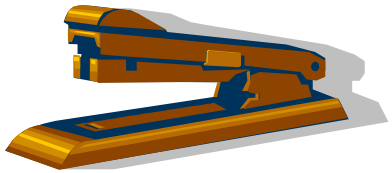
Use the yellow cards. Write one risk per card. Use complete senten
Do not discuss with your team…yet (take about 20 Minutes)

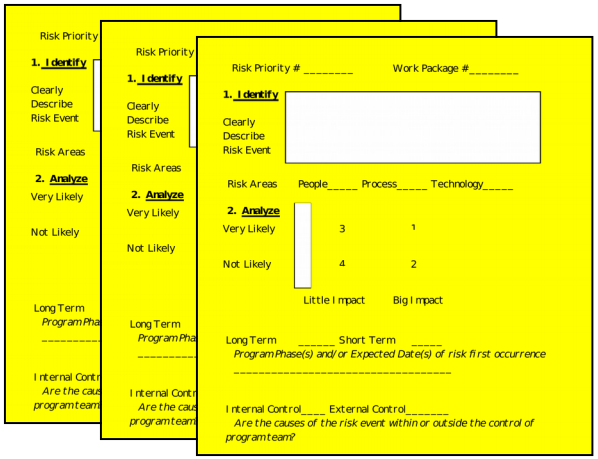


Also check if
The risk event Is
PEOPLE
PROCESS OR
TECHNOLOGY

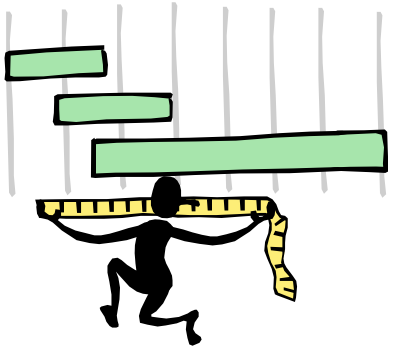
Identification and Consolidation

Using the Risk events from your cards, clarify risks and consolidate (staple together) duplicate risk cards.



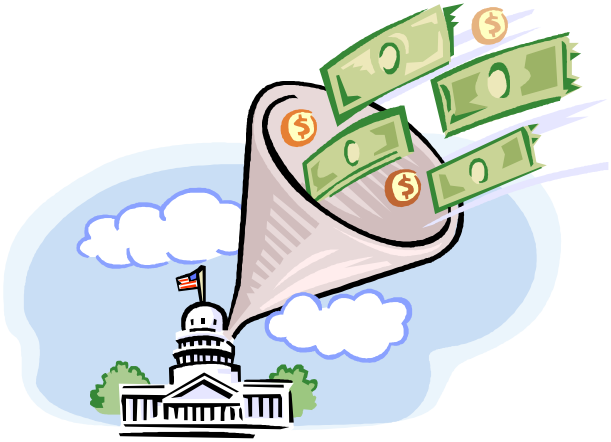


ANALYZE



Risk Evaluation Benefits

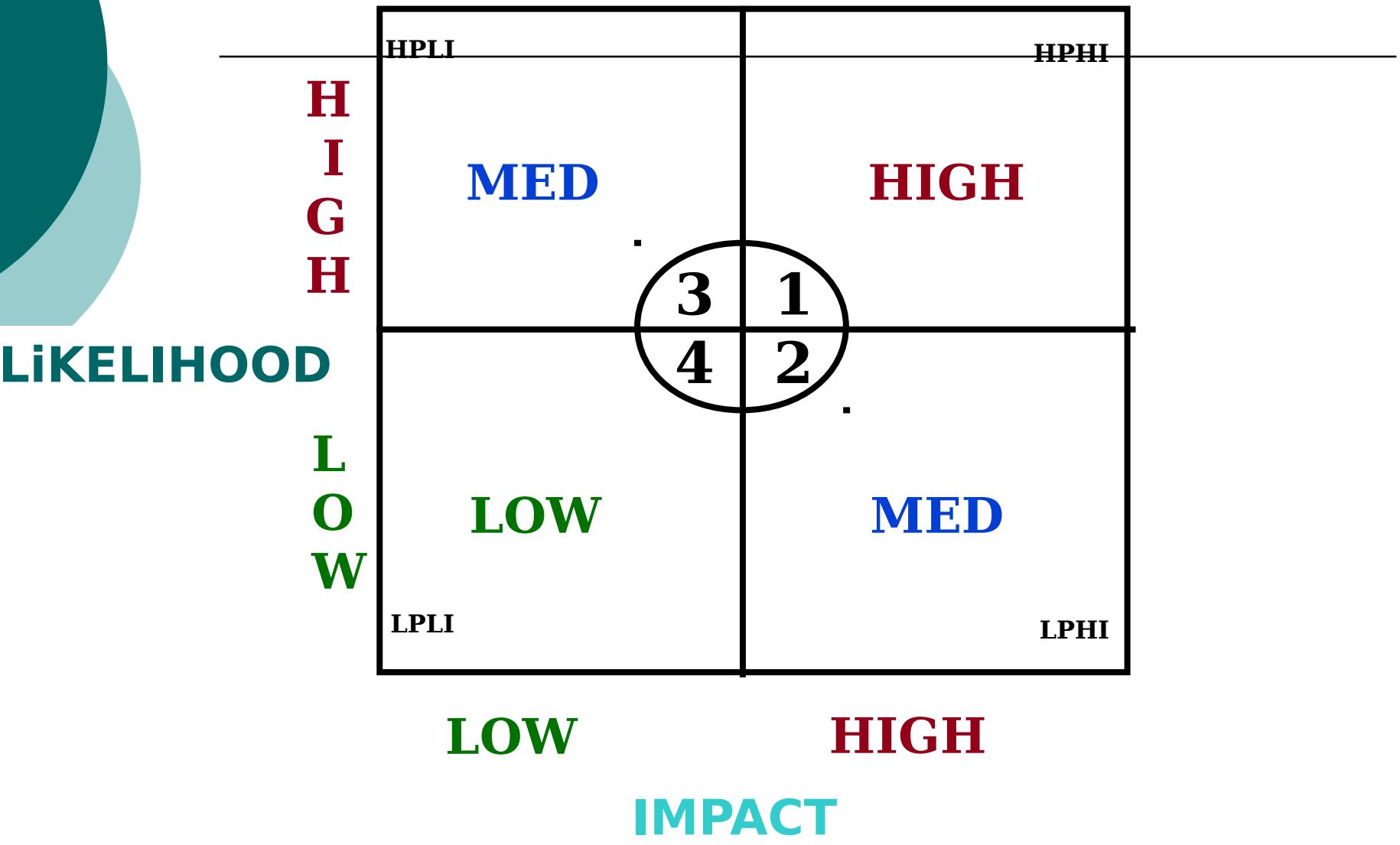
WHY Evaluate Risks?



Prioritize

Risk Evaluation

Classification/Ratings



Navy Risk Evaluation Process

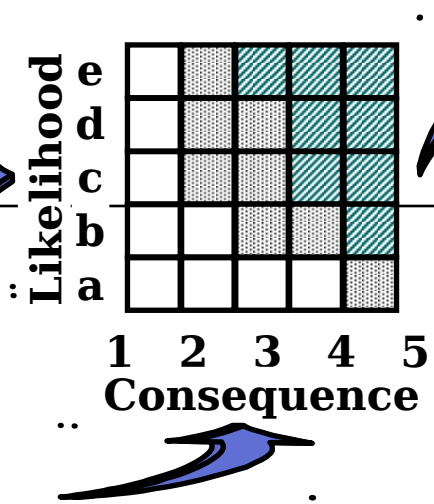
Questions about Risk Management?

…l a Member of the …ocess Integration …Team for Risk.

ASSESSMENT GUIDE

***…HOOD*:**

What Is The …ood …The Risk Will …n?	**Remote**
	Unlikely
	Likely
	Highly Likely
e	**Near Certainty**



***CONSEQUENCE*:**
Given The Risk is Realized, What is the Magnitude of the Impact?

Level	Technical Performance	and/or Impact on Other Teams	Schedule	and/or	and/or Cost
1	Minimal or No Impact		Minimal or No Impact		Minimal or No Impact None
2	≤ 5% Reduction in Margin	Acceptable with Some Impact	Additional Resources Required ; Able to Meet Need Dates		
3	5 - 7% Significant Reduction in Margin	Acceptable with Moderate Impact	Minor Slip in Key Milestone; Not Able to Meet Need Dates		
4	> 7 - 10% Remaining Margin	Acceptable, No Major Impact	Major Slip in Key Milestone or Critical Path Impacted		
5	> 10%	Unacceptable	Unacceptable	Can't Achieve Key Team or Major Program Milestone	

RISK ASSESSMENT

HIGH - Unacceptable. Major disruption likely. Different approach required. Priority management attention required.

MODERATE - Some disruption. Different approach may be required. Additional management attention may be needed.

LOW - Minimum impact. Minimum oversight needed to ensure risk remains low.

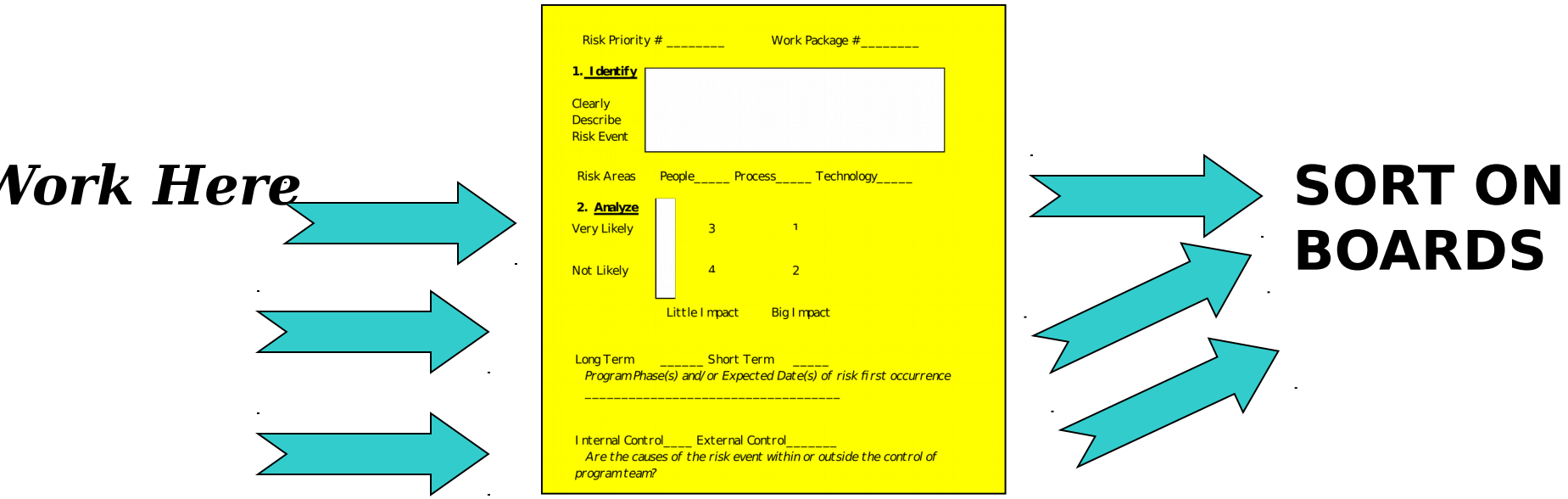
Likelihood and Impact Criteria Definition

The IPT needs to define the criteria for likelihood and impact for evaluating your project.

- **Likelihood**
  - Very Likely (Example: “expect this risk greater that one in three chance to occur”)
  - Not Likely (Example: “expect this risk less than a one in three chance to occur”)
- **Impact** (Criteria for Cost and/or schedule and/or performance and/or other programs)
  - Little Impact
  - Big Impact

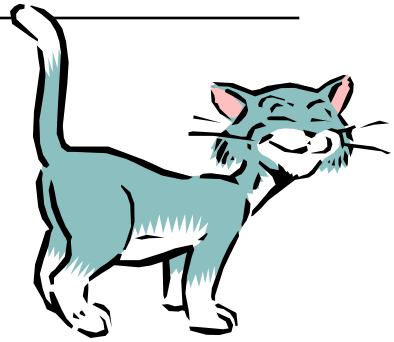
Risk Evaluation

- Using your risk cards and your probability and impact criteria, short term and long term criteria and controllability criteria, mark the cards and sort on the boards.



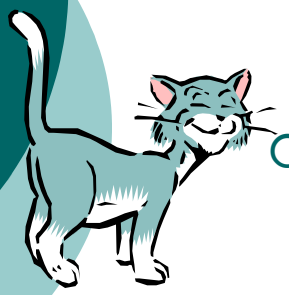
RISK HANDLING STRATEGIES

DEVELOP RISK HANDLING STRATEGIES



- **C**ONTROL
  - REDUCE LIKELIHOOD
  - REDUCE IMPACT
- **A**VOID
- **A**SSUME
- **T**RANSFER

Risk Handling Strategy #1
CONTROL: Reduce Likelihood

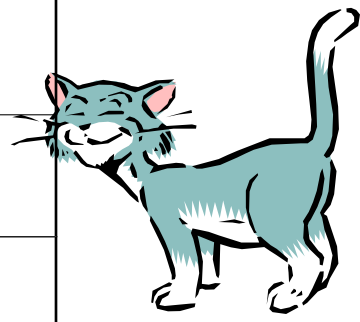


- **DEFINITION:** *Lowering the probability of* the risk event occurrence.

- **EXAMPLE:** Providing a redundant power supply for a computer system to increase overall system availability and reducing the number of downing events.

CONTROL: Reduce Likelihood: Tools and Techniques

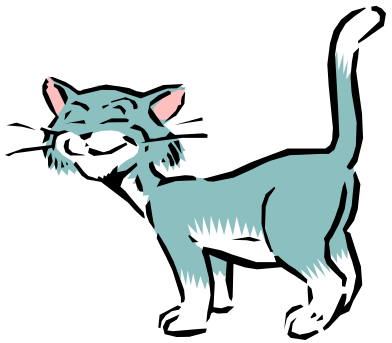
PEOPLE	PROCESS	TECHNOLOGY
TRAINING	REQUIREMENTS	USE PROVEN TECHNOLOGY
HIRING/PROMOTION	DESIGN REVIEWS	MOCK-UPS & PROTOTYPING
COMMUNICATION	RIGOR	TECHNOLOY MATURATION
LEADERSHIP	TEST PROGRAM	REDUNDANT DESIGN
KNOWLEDGE SHARING	TRADE STUDIES	ROBUST DESIGN
	MODELING & SIMULATION	OPEN SYSTEMS
	MULTI-PHASE DEVELOPMENT	



Risk Response Strategy #2
CONTROL: Reduce Impact

- **DEFINITION:** A method of controlling the risk event by *softening* the effect or impact should the risk event occur.

- **EXAMPLE**: An aircraft having an auxiliary hydraulic system in the event the primary system fails



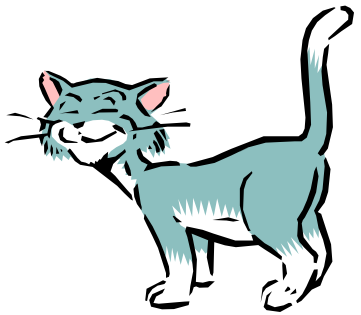
Reduce Impact: Tools and Techniques

PEOPLE	PROCESS	TECHNOLOGY
TRAINING	CONTINGENCY PLANNING	USE FAMILIAR TECHNOLOGY
HIRING/PROMOTION	A SECOND MANUFACTURER	PROTOTYPING
COMMUNICATION	RESERVE BUDGET	TECHNOLOGY MATURATION
LEADERSHIP	SCHEDULE SLACK	REDUNDANT DESIGN
KNOWLEDGE SHARING	INSURANCE	WARRANTEES
IPT	REPORTS	MULTIPLE DEVELOPMENTS

Risk Response Strategy #3 Avoid

- **DEFINITION:** Avoidance of the risk areas or sources that could possibly lead to the risk event.

- **EXAMPLE:** Eliminate a requirement to build a subsystem because the technological risk is too high.

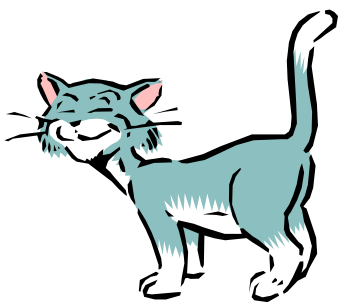


Avoid:
Tools and Techniques

PEOPLE	PROCESS	TECHNOLOGY
REORGANIZE	REENGINEER (DELETE FROM PROCESS)	DELETE REQUIREMENT
HIRING/PROMOTION/ FIRE	CHANGE VENDOR	REDESIGN
COMMUNICATION	CANCEL PROGRAM	DIFFERENT TECHNOLOGY
GIVE TO ANOTHER PERSON OR TEAM	BLOCK UPGRADE	
	USE DIFFERENT PROCESS	

Risk Handling Strategy #4 ASSUME

- **DEFINITION:** Acknowledging a future risk event and accepting the potential consequences without any efforts to control it.



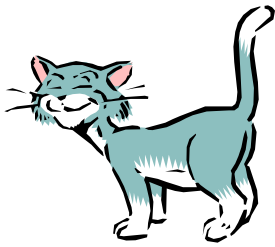
- **EXAMPLE:**Only having “one deep” project team member and consciously not training a backup. (Either too costly or not enough resources available.)

ASSUME:
Tools and Techniques

PEOPLE	PROCESS	TECHNOLOGY
ACCEPT THOSE GIVEN TO YOU	NO CHANGES	ACCEPT THE DESIGN AND PLANNED TECHNOLOGY

Risk Handling Strategy #5 Transfer

- **DEFINITION:** Reduction of risk exposure by reallocation of risk from one part of the system to another or redistributing risk between the Government and the prime contractor or between Government agencies. (Part of the functional allocation process)

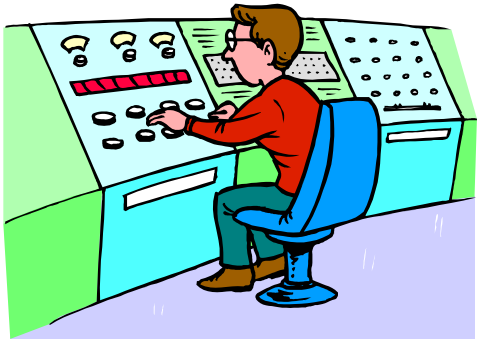


- **EXAMPLE:** The Marine Corps decides to have the Army as lead service to develop a new tracked recon vehicle.

Transfer:
Tools and Techniques

PEOPLE	PROCESS	TECHNOLOGY
ASSIGN TO ANOTHER PERSON	MODULAR DESIGN	TRANSFER FUNCTION BETWEEN HARDWARE AND SOFTWARE
GIVE TO ANOTHER TEAM	FUNCTIONAL PARTITIONING	SUBSTITUTE A DIFFERENT COMPONENT
OUTSOURCE TO CONTRACTOR	PAY PATENT ROYALTIES TO USE A MANUFACTURING PROCESS	SUBSTITUTE A DIFFERENT SYSTEM

MONITOR



Risk Control

- TRACK AND EVALUATE RISK HANDLING AGAINST METRICS
  - TEST AND EVALUATION
  - EARNED VALUE
  - TECHNICAL PERFORMANCE MEASURES
- Assign people and set time for risk handling to occur

Risk Management: Workarounds

- When changes occur, review project risk plan.
- Check risks along critical path.
- Check high risks outside of critical path.
- Check WBS.
- Involve all appropriate IPT members.
- Ensure program team has expertise and/or resources to mitigate new risks.

WHEN TO REVIEW RISKS

High risks- weekly agenda items for team meetings

Medium risks – monthly reviews

Low risks – each milestone, large program changes, or when the Risk Plan is redone

Risk Documentation

- Important to Document
  - Lessons learned spread to other programs
  - Risk tracking
- Many tools available such as Risk Radar or Risk Matrix
- Easy to make up your own on on Excel, Access or Word

Risk Management: Deficiencies

- Process weakly structured.
- Process too subjective.
- Risk likelihood overemphasized and impact underemphasized.
- Risk plans unlinked to plans and milestones
- Resources not assigned for risk mitigation.
- Inadequate documentation.
- Not assessing overall program risk relative to program opportunity.

CONCLUSION

- **Risk Management techniques can be applied in almost all areas of project management.**
  - Budgets, Schedules, Requirements, Contracts – all interrelated to Risk Management Plan
- RM techniques must be **continuously and iteratively applied.**
- This is a **team** not an individual effort!